

## Review<sub>2</sub>: Final Exam

Name: \_\_\_\_\_

1. A student burns 61.94 g of phosphorus in a crucible exposed to the air. Afterwards the resulting power is massed and found to be 141.94 g. The molecular mass of the compound that was formed is 283.87 g/mole. Find the empirical formula and the molecular formula for the compound.

a) What is the empirical formula?

b) What is the molecular formula?

2. A student measures out 1.0 moles of nitrogen gas and finds that it occupies a volume of 22.4 L when the temperature is 0°C and the pressure is 760 mm Hg.

a. What is the density of nitrogen gas at STP? (Give your answer in g/mL)

b. What volume will the nitrogen gas occupy if it is heated to a temperature of 345 K and exposed to a pressure of 1.4 atm?

	<b>P</b>	<b>T</b>	<b>V</b>	<b>n</b>
<b>Initial</b>				
<b>Final</b>				
<b>Effect</b>				

c. What is the density of the nitrogen gas at the new temp and pressure?

3. Suppose in the Icy Hot lab that the burner transfers 450 kJ of energy to 625 g of liquid water at 20.°C while converting that water to steam.

**Energy constants (H<sub>2</sub>O)**

334 J/g Heat of fusion (melting or freezing) H<sub>f</sub>

$$Q = m C (T_f - T_i)$$

2260 J/g Heat of vaporization (evaporating or condensing) H<sub>v</sub>

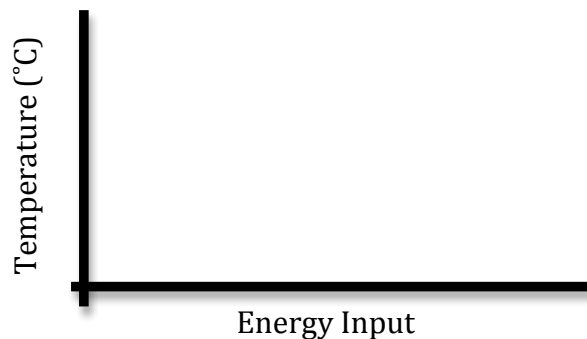
31.3 J/g°C Heat capacity (c) of water vaport

$$Q = m H$$

2.1 J/g°C Heat capacity (c) of solid water

4.18 J/g°C Heat capacity (c) of liquid water

- a. Sketch in the heating curve of water, and label the beginning and ending points of the problem.



- b. What mass of the water would be boiled away?

4. Answer each of the following by making the correct conversions.

- a. How many atoms of chromium do you have if you have 104 g of chromium metal?

- b. If you have  $9.03 \times 10^{24}$  molecules of ammonia (NH<sub>3</sub>), how many grams of ammonia do you have?

- c. Using electricity, 4.0 moles of iron (III) oxide are decomposed into its elements. How many molecules of oxygen gas will be obtained?

4. Write proper names for each formula. Write proper formulas for each name.

Formula	Name		Name	Formula
H <sub>2</sub> O			Mercury (II) sulfite	
Cu(ClO <sub>3</sub> ) <sub>2</sub>			Sulfurous acid	
NO <sub>3</sub>			Oxygen dichloride	
IF <sub>7</sub>			Ammonium nitride	
H <sub>3</sub> PO <sub>4</sub>			Hexaboron monosilicide	
Li <sub>2</sub> S			lead (IV) phosphate	

5. Describe each of the boxes below using the terms ATOMS, MOLECULES, ELEMENT, MIXTURE, PURE SUBSTANCE, SOLID, LIQUID, GAS.

